

REMARKS/ARGUMENTS

Claims 1, 12, 19 and 38 have been revised to use alternative language for the identical concept of the claimed subject matter being distinct from aerogels that are formed by joining together of aerogel particles or granules in a binder. Specifically, the claims now more expressly recite that it is a monolith composite of aerogel that is encompassed. Support for the revised language is present throughout the application and claims as originally filed.

Claim 1 has also been amended to use alternative language for the same concepts as previously recited in the claim. For example, the phrase “to serve as a flexible, durable, light weight insulation product” remains in the claim to define the properties inherently present given the aerogel monolith material recited in the claim. Similarly, the “reinforcing structure” in the aerogel monolith remains in the claim by being rephrased as a “reinforcement within the monolith”. Accordingly, Applicants believe that claim 1 has not been narrowed by the amendments, and no new matter has been introduced.

Claim 16 has been revised to be directed to another aspect of the invention as supported in the specification at least on page 13, lines 1-2.

Claims 19, 44, and 45 have been revised to correct language informalities.

Claims 34 and 36 have been revised to use alternative language for the identical concept of the composite of the invention “in combination with” additional elements. No narrowing of claim scope is intended or believed to have occurred.

No new matter has been introduced, and entry of the amendments is respectfully requested.

Preliminary Remarks

Applicants note that none of claims 19-48 were indicated as being within the scope of rejections alleging anticipation and obviousness in light of Ramamurthi. Accordingly, Applicants believe that claims 19-48 are free of the prior art and respectfully request early indication to that effect.

Information Disclosure Statement

An Information Disclosure Statement citing only the five patents discussed on pages 3-4 of the instant application (paragraphs 0006 to 0009 on pages 1-2 of the published version of the instant application) has been submitted previously. Applicants respectfully submit their belief that these documents were already considered by the Examiner during previous examination of the instant application.

Applicants express their gratitude in advance to the Examiner for the courtesy of assisting Applicants with making these references formally of record in the instant application.

Claim Objections

Claims 19 and 44-45 (rather than 45-46 as indicated) were objected to due to the presence of unnecessary hyphens in the claims. This informality has been addressed by the above amendments, and the objection may be withdrawn.

Rejections under 35 U.S.C. § 112, first paragraph

Claims 1, 12, 19 and 38 were rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement due to the use of the phrase “the aerogel monolith is not formed by a joining together of aerogel particles or granules in a binder.” The statement of the rejection alleged that this phrase is “new matter” and a “negative limitation”.

Applicants have carefully reviewed the statement of the rejection and respectfully submit that it has been obviated by the above amendments to the claims and without acquiescence to the positions set forth in the rejection. As an initial matter, claim 12 has been revised to omit the phrase.

Additionally, claims 1, 19 and 38 have been revised to capture the same concept without use of the phrase. As now presented, claims 1, 12, 19, and 38 remain directed to the concept of an aerogel monolith that is a composite comprising a lofty fibrous batting and other

fibers as recited in the claims. As indicated by Ramamurthi et al. (USP 5,306,555 as cited in the “final” Office Action), there are two forms of aerogel materials beyond “conventional aerogels”. As shown at the bottom of the front page of Ramamurthi et al., the two forms are “aerogel matrix composites” (which are produced as an aerogel monolith) and “aerogel powder-fiber compacts” (which are produced by compacting powders with fibers in the presence of a binder). The phrase objected to in claims 1, 12, 19 and 38 was directed to exclusion of the latter, “aerogel powder-fiber compact” form.

As presented, claims 1, 12, 19 and 38 remain directed to the “aerogel matrix (or monolith) composite” form without altering the scope of the claims.

In light of the above, Applicants respectfully submit that this rejection has been rendered moot, and may be properly withdrawn.

Rejections under 35 U.S.C. § 112, second paragraph

Claims 34 and 36 were rejected under 35 U.S.C. § 112, second paragraph, as allegedly indefinite because “it is unclear whether the heat sink and the device which converts the thermal energy to electrical energy are being claimed and a part of the system.” The statement of the rejection further alleges that the phrase “in combination with” was in the “preamble” of the claims

Applicants have carefully reviewed the statement of the rejection and respectfully submit that no *prima facie* case of indefiniteness has been presented. As an initial matter, the phrase “in combination with” is not in the preamble of the claim because it is the transitional phrase going from the preamble to the body of each of claims 34 and 36. As established in U.S. patent practice, the range of transitional phrases are not limited to “comprising”, “consisting of”, and “consisting essentially of”, but is significantly broader such that phrases like “having”, “including”, and “containing” are also possible.

In the instant case, Applicants’ previous representative chose to use “in combination with” as the transitional phrase. Accordingly, no *prima facie* case of indefiniteness is present in claims 34 and 36 as previously presented.

In light of the instant rejection, however, Applicants have revised the phrase to be “comprising” without narrowing the scope of the claims, which has always encompassed the presence of the “heat sink” and “device” as recited in the claims.

Given the above, Applicants believe that this rejection was misplaced and could have been withdrawn without revisions of claims 34 and 36. In light of the revisions, the rejection has definitely been obviated, and Applicants respectfully request its withdrawal.

Rejections Based Upon Cited Documents

Claims 1-3, and 7-8 were rejected under 35 U.S.C. § 102(b) as allegedly anticipated by Ramamurthi et al. (USP 5,306,555). Applicants have carefully reviewed the statement of the rejection and respectfully submit that no *prima facie* case of anticipation has been presented.

Claim 1 is directed to a composite article comprising an aerogel monolith containing “a lofty fibrous batting as a reinforcement” within the monolith. The instant application, at page 11, first full paragraph, to the end of page 12 in the specification, provides a detailed description of what is meant by a “lofty fibrous batting”.

In sharp contrast, Ramamurthi et al. do not even use the term “batting” in their disclosure. Instead, they describe the use of fibers of various lengths which “may be randomly distributed or oriented.” See column 4, lines 30-38, which also state that the fibers may be “in the form of individual fibers, bundles of fibers, mats or sheets, woven or unwoven....” As would be clear to the ordinary artisan, however, none of these descriptions is of a batting material as set forth in the instant application.

It is clear that “[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.”¹ This standard is set forth in MPEP 2131 as well as the cases cited therein.

¹ *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

The instant rejection, however, fails to meet the above standard at least because of the failure of Ramamurthi to teach the use of a “lofty fibrous batting”. As described in the paragraph bridging pages 11 and 12, the “lofty fibrous batting” preferably contains “few individual filaments (or fibers)”. Moreover, the last paragraph on page 12 describes the batting as “substantially different from a fibrous mat”. Therefore, and contrary to the position set forth in the instant rejection, neither the individual fibers or mats disclosed by Ramamurthi et al. can be considered the “lofty fibrous batting” of the claims.

Furthermore, and as would be recognized by the ordinary artisan, none of the concepts of “bundles of fibers, mats or sheets, woven or unwoven” as used by Ramamurthi et al. are synonymous with “lofty fibrous batting” as used in the claims. Accordingly, Ramamurthi et al. fail to disclose all of the requirements of claims 1-3 and 7-8, and thus cannot anticipate these claims.

In light of the above, Applicants respectfully request withdrawal of the instant rejection.

Claim 5 was rejected under 35 U.S.C. § 102(e) as allegedly anticipated by, or alternatively under 35 U.S.C. § 103(a) as obvious over, Ramamurthi et al. (USP 5,306,555). Applicants have carefully reviewed the statement of the rejection and respectfully submit that no *prima facie* case of anticipation or obviousness has been presented.

As an initial matter, Applicants strongly traverse the allegation that Ramamurthi et al. disclose “the use of like materials (i.e. lofted batting...)” because the reference never uses the term “loft” or any derivative thereof. The instant rejection cannot stand to the extent that it relies upon this misinterpretation of the cited reference.

Moreover, Applicants are confused by the allegation of obviousness based upon the cited reference. The statement of the rejection indicates that Ramamurthi et al. do not teach the specific “thermal conductivity less than 50 mW/m-K” limitation in claim 5. Accordingly, and in adherence to the standards for a *prima facie* case of obviousness, there must be a

suggestion or motivation to modify the disclosure of Ramamurthi et al. to arrive at the limitation found in claim 5 (see the standard set forth by MPEP 2143.01 and the cases cited therein).

MPEP 2143.01 also states that “[o]bviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so....” As set forth by the Federal Circuit, “[t]here are only three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art.”² Thus it is not permitted to base the requisite suggestion or motivation on an unappreciated inherent feature of Ramamurthi et al.

The instant rejection, however, fails to provide any basis for a suggestion or motivation to prepare a composite article having fibers with “thermal conductivity less than 50 mW/m-K” limitation as recited in claim 5. Instead, the statement of the rejection alleges that such a level of thermal conductivity is an undisclosed inherent feature of carbon fibers disclosed by Ramamurthi et al. Regardless of whether the allegation of inherency is correct, it is simply not adequate to allege that the necessary suggestion or motivation is present based upon this unappreciated feature.³ Stated differently, there is simply no means to allege that based on a disclosure of carbon fibers, the ordinary artisan would be led to the genus of fibers with “thermal conductivity less than 50 mW/m-K”. Accordingly, no prima facie case of obviousness is present and this aspect of the rejection should be properly withdrawn.

With respect to the allegation of anticipation, and without acquiescence to whether the carbon fiber of Ramamurthi et al. meets the requirement for a “thermal conductivity less than 50 mW/m-K”, Applicants respectfully point out that such a carbon fiber must still be in the form of a “lofty fibrous batting” in order for Ramamurthi et al. to anticipate claim 5. But as explained above, Ramamurthi et al. contains no disclosure of a “batting” material sufficient to

² *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457-1458 (Fed. Cir. 1998).

³ Moreover, Applicants respectfully point out that the Examiner’s allegation of inherency is factually incorrect. The thermal conductivity of carbon fiber is very high, ranging from 14,000 mW/m-K to 500,000 mW/m-K. Carbon fiber is often favored for its high degree of thermal conductivity, which can be higher than that for copper or aluminum.

meet the requirements of claim 1, and thus claim 5 (which depends from, and has all the limitations of, claim 1).

With respect to the alleged burden upon Applicants to prove that no case of anticipation based on inherency is present, the citations of *In re Fitzgerald* and *In re Best* are not applicable because no case of anticipation is yet present. Stated differently, and in contradistinction to statements in the instant rejection, the composite article of claim 5 is not present in the Ramamurthi et al. product because the latter product does not contain a “lofty fibrous batting” as required by claim 5.

Accordingly, and for the reasons explained above, Ramamurthi et al. cannot anticipate claim 5. Withdrawal of the instant rejection is thus respectfully requested.

Claims 6 and 9-18 were rejected under 35 U.S.C. § 103(a) as unpatentable over Ramamurthi et al. (USP 5,306,555). Applicants have carefully reviewed the statement of the rejection and respectfully submit that no *prima facie* case of obviousness has been presented.

As an initial matter, Applicants are concerned over certain statements alleged in the instant rejection. Specifically, and on page 6 of the Office Action, the Examiner alleges that

It should be noted that the quantity of fibers, amount of dopant, cross-sectional area of fibers visible and batting density are *result effective variables*. For example, as the quantity of fibers and density increases, the batting becomes more lofted. As the diameter of the fibers decrease, the material becomes more flexible. As the aspect ratio increases, the length in relationship to the diameter increases. As the amount of dopant increases, conductivity increases. As the visible cross-sectional area increases, the properties of the batting changes. (italics added)

The statements then include the allegation that “it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.”

Applicants respectfully submit that regardless of whether the above statements are correct, it is first necessary to recognize that the concept of “result-effective variable” is only applicable in cases related to the “optimization of ranges” (see MPEP 2144.05 and the cases cited therein). Therefore, the claimed invention must be one that is already recognized in the art such that the only difference from prior art knowledge is a parameter that is recognized in the art as a “result-effective variable”. Therefore, and with respect to claims 6 and 9-11, all of which are dependent directly or indirectly from claim 1, the invention of claim 1 must already be recognized in the art in order for the requirements of claims 6 and 9-11 to possibly be a “result-effective variable”.

Unless recognition in the art is a pre-requisite to an allegation of a “result-effective variable”, every dependent claim with a further range limitation that affects the performance or characteristic of a claimed invention can be alleged as merely containing a “result-effective variable” by use of an *improper hindsight* based assertion. This would be contrary to the well settled principles that Applicants’ disclosure cannot be used as a roadmap for improper hindsight reconstruction of the invention as claimed. U.S. patent law simply does not permit such reliance on hindsight.

The statement of the rejection, however, fails to provide any support for the notion that the alleged “result-effective variables” were recognized by an artisan of ordinary skill in the absence of the instant application. Accordingly, the instant rejection fails to present a *prima facie* case of obviousness.

Moreover, and as explained above, claim 1 encompasses novel articles over Ramamurthi et al. because the latter do not disclose composite articles containing “lofty fibrous batting”. Therefore, it is not possible for the parameters recited in claims 6 and 9-11 to be recognized as “result-effective variables” by an artisan of ordinary skill at the time of the invention.

Accordingly, and because claim 1 is novel and non-obvious over Ramamurthi et al., claims 6 and 9-11 must also be non-obvious over the same reference. Stated differently, obviousness of particular ranges cannot be supported by mere allegation that those ranges can be optimized in the absence of motivation, based on recognition, in the art of doing so.

A similar conclusion follows for claims 12-18 upon a review of independent claim 12, which requires that the fibrous batting in the aerogel monolith be “sufficiently lofty that the cross-sectional area of the fibers of the batting visible in a cross-section of the composite is less than less than 10% of the total surface area of that cross section”. As explained above, the allegation that a cross-section of less than 10% is a “result-effective variable” is only possible if an aerogel monolith comprising the required “lofty fibrous batting” is already recognized in the art. But as discussed above with respect to claim 1, Ramamurthi et al. fails to disclose any aerogel monolith comprising a “lofty fibrous batting”. Accordingly, claim 12 is not anticipated or rendered obvious in light of Ramamurthi et al.

Moreover, claims 17 and 18, which depend from claim 12, cannot merely contain “result-effective variables” as alleged for the same reasons as provided above for claims 6 and 9-11. Accordingly, none of claims 12, 17, or 18 are obvious in light of Ramamurthi et al.

With respect to claim 11, Applicants respectfully point out that the claim also requires the fibers to be “evenly dispersed throughout the composite”. This is not taught or suggested by the Ramamurthi et al. reference. Accordingly, claim 11 is patentable over this reference.

With respect to claims 13 and 14, which depend from claim 12, the fact that claim 12 is non-obvious over the Ramamurthi et al. reference means that the requirement for a “lofty fibrous batting” in claims 13 and 14 (by virtue of their dependence from claim 12) remains novel and non-obvious over the reference. Accordingly, claims 13 and 14 are patentable over Ramamurthi et al.

With respect to claims 15-17, Applicants respectfully, and strongly, traverse the “presumptions” of the limitations of claims 15-17 being met by “the use of like materials (i.e. lofted batting with aerogel and conducting fibers) which would result in the claimed property.”

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AMENDMENT and REPLY UNDER 37 C.F.R. § 1.114
(RCE)
Examining Group 1771

PATENT

On its face, the presumptions appear to be an attempt to avoid the need for the cited reference to teach or suggest all the limitations of claims 15-17. The alleged support for the presumptions is the assertion of Ramamurthi et al. having taught the use of "lofted batting". But Ramamurthi et al. never use the term "loft" or any derivative thereof. Therefore, how can they have disclosed or suggested the use of material that has the properties recited in claims 15-17?

The attempt to avoid the need for references to disclose or suggest all limitations of a claim is simply not permitted under U.S. law. Accordingly, this portion of the rejection is poorly supported and should be withdrawn.


In light of the above, Applicants respectfully submit that no *prima facie* case of obviousness exists for any of claims 6 and 9-18. Accordingly, withdrawal of the instant rejection is respectfully requested.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance and an action to that end is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 858-350-6151 .

Respectfully submitted,


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